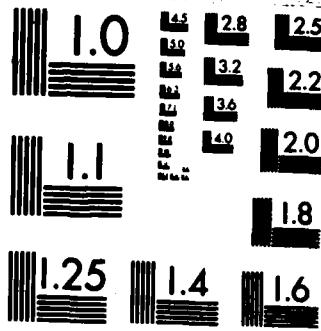


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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

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## FOREIGN TECHNOLOGY DIVISION



ELECTRONIC RECONNAISSANCE AIRCRAFT OF THE  
SOVIET UNION NAVY

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## ELECTRONIC RECONNAISSANCE AIRCRAFT OF THE SOVIET UNION NAVY

Gorshkov, the Deputy Minister of the Ministry of Defense and the Commander of the Navy of the Soviet Union pointed out: "The Fleet of the Soviet Union has been greatly developed since the 1960's. The Fleet, which was basically a seacoast defense force, now has become an ocean-going fleet and is a tremendous striking force." In order to carry out combat operations efficiently, Soviet Naval theory pays no less attention to the security and reliability of communications and to extensive, continued reconnaissance activities than to the combat Navy itself. The Soviet Navy established a extensive ocean monitoring system to gather intelligence accurately and quickly. This system consists of reconnaissance satellites, warships, aircraft, large radio interception networks, and a great deal of equipment for collecting and appraising information. Aircraft play an important role in this system. The current Soviet Naval Air Force has seven kinds of electronic reconnaissance and monitoring airplanes; these are modified from models of military and civil transport aircraft and bombers. They are: Antonov An-12 Young Fox-B, Ilyushin Il-18 Black Crow-A, Tupolev Tu-20/142 Bear-D, Tu-16 Badger-D, Badger-F, Badger-K, Tu-22 Blinder-C. There are an estimated 150 aircraft. Their brief introductions follow respectively:

### An-12 Young Fox-B

The Young Fox-B is a modified model from the military transport aircraft An-12. Its earliest sighting was in the end of the sixties or the beginning of the seventies. This version is specially used for electronic reconnaissance duties. About a total of 20 were built. Only the Baltic Sea Fleet and Black Sea Fleet of the U.S.S.R. Navy are equipped with this kind of airplane. The range of its reconnaissance includes the Baltic Sea and the Indian Ocean. Most of the Young Fox-B are marked with civil aviation emblems, perhaps because they have to fly on the civil routes where overt military activities are not appropriate.

The Young Fox-B are directly modified from the military transport model into electronic reconnaissance aircraft by adding diverse reconnaissance equipment; they still retain the complete design characteristics of the An-12.

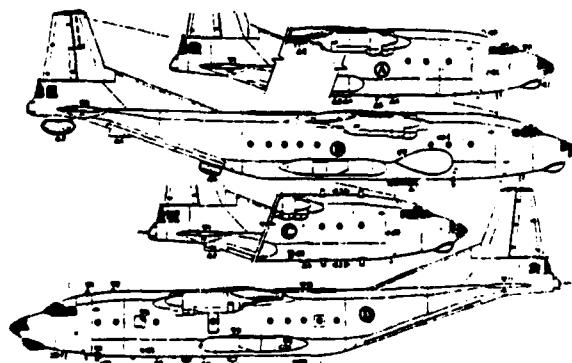


Figure 1. Four side views of the An-12 Young Fox-B

Every part of the body of Young Fox-B is equipped with various detectors. The giant load-carrying cargo bay provides commodious space for the electronic equipment. The bow cockpit, which is pressurized and air conditioned, provides a suitable environment for operators.

The four side views shown in figure 1 are sketched from photographs of the Young Fox-B, which were taken during the mid-seventies and the early eighties. The figure shows that the Young Fox-B electronic reconnaissance aircraft are equipped with many antennas and cowls. There are also fine distinctions among different airplanes.

Figure A is sketched from photographs shot above the Indian Ocean in the middle of the 1970's. Its distinguishing feature is the maintenance of the standard tail cannon cockpit, but without cannons. The visible antennas and equipment on figure 1A include:

1. a small-sized, knife-shaped aerial;
2. three doublet antennas of identifiers for distinguishing friend and foe.
3. a stub antenna;
4. a bubble cowl;
5. a swept back knife-shaped aerial;
6. a knife-shaped aerial;
7. an I-band navigation radar;
8. a small cowl;
9. a swept back knife-shaped aerial.

Fig.B is sketched from the photographs taken in 1982.

The visible antennas and equipment in the picture include:

1. an embedded VOR antenna (Very high frequency omnirange antenna);
2. a J-band maritime search radar;
3. a T-shaped antenna;
4. a box structure embedded in the rear cockpit, which is possibly a passage for cooling airborne equipment;
5. a circular dielectric cowl;
6. a big drop-shaped cowl, which measures about 3.35m in length;
7. a knife-shaped antenna 1.8m in length on the belly of the airplane;
8. a bubble cowl;
9. a knife-shaped aerial.

Fig.D is sketched from another photograph shot above the Baltic Sea. This is the only one marked with a military sign among the four planes. The visible antennas and equipment on the outside of this airplane are.

1. a knife-shaped antenna;
2. a stub antenna;
3. an array of the doublet antennas;
4. a stub antenna;
5. an array consisted with 6 whip antennas;
7. a semispheroidal dielectric cowl;
8. a knife-shaped antenna;

9. a bubble cowling;
10. a high frequency communication antenna;
11. an altimeter aerial;

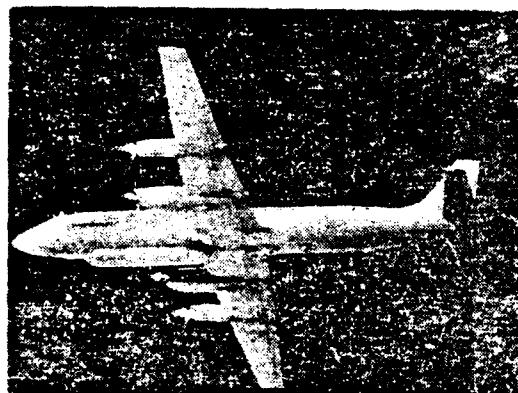


Figure 2. Il-18D Black Crow-A

Young Fox-B is a very efficient detection platform which the Soviet Union can make suitable for completing a series of specific missions. Among the above-mentioned four aircraft, the one in figure B is worthy of the most attention. This is the most modified of these aircraft up to now.

#### Il-18D Black Crow-A

Il-18 is a turboprop medium-range passenger plane designed by the Ilyushin Designing Institute of the Soviet Union. The Il-18D, the military electronic reconnaissance version of the Il-18, appeared for the first time in 1978 (another opinion is that this version was numbered Il-20) and was named Black Crow-A. The activity range of this aircraft is the airspace over the Baltic Sea. Opinions vary on the number of this aircraft with that the Soviet armed

Forces have been equipped. There are an estimated 20 aircraft. It is said, this version is used for both the Soviet Navy and Air Force.

The Black Crow-A still retains the structure and the basic external form of the civil version, as well as the arrangement of the portholes of passenger cabin, only the inside of the aircraft was been modified to suit the needs of the new task. The antennas and equipment visible on it in Figure 3 include:

1. a very high frequency omnirange;
2. a dielectric cowl or window at the right side of the back fuselage;
3. a bump proof tail skid;
4. a cowl;
5. dielectric panels (three for each side);
6. 5 short antennas;
7. a dielectric panel on the door of side cargo bay;
8. a cylindrical outer covering;
9. a bubble-shaped covering;
10. a suspended cabin which measures 10.25m in length, 1.15m in height; a side-looking airborne radar is probably the equipment inside this cabin.
11. a small cowl;
12. a suspended cabin 4.4m in length and 0.88m in height;
13. a knife-shaped antenna;

14. a cylindrical stick;
15. a knife-shaped antenna;

The performance of the side-looking radar in the suspended cabin underneath the aircraft body is not yet clear. It is allegedly a J-band radar. The size of its antenna makes known the very fine performance capability of this radar. The diverse cowls on the fuselage are generally.....cabin (note: The Chinese text has omitted two words) or radar cabin. Undoubtedly, this is a well equipped aircraft. Its exact role in electronic reconnaissance is not yet clear. It is said, like the RC-135 of the United States, the Black Crow-A is charged with a strategic task but not a tactical task.

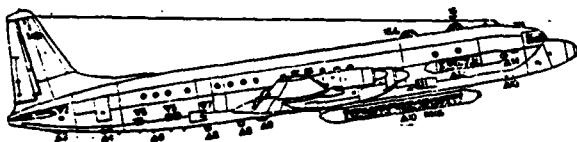


Figure 3. IL-18D Black Crow-A

#### Tu-20 Bear-D

The Tu-20, called also Tu-95, is a strategic bomber. The Soviet Union began its design in 1951, and the bomber was delivered in 1957. The different versions of the aircraft

ar" rise to a total of 6 types. A and B are strategic bombers. C, D, E, and F, are, respectively, a maritime patrol version, an electronic reconnaissance version, a maritime reconnaissance version, and a maritime anti-submarine patrol version.

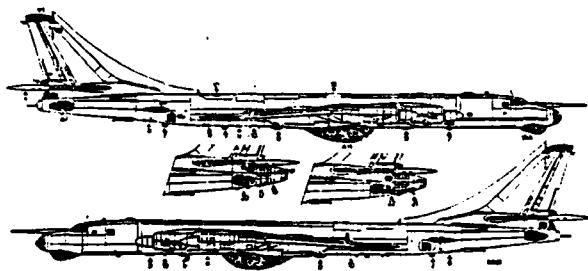


Figure 4. Tu-20 Bear-D

The electronic reconnaissance aircraft Bear-D (fig. 4) first seen in August 1967. This aircraft is the principal component of the monitoring system of the Soviet Union. There are an estimated 45 aircraft in the Soviet Northern Fleet and the Pacific Fleet. The Bear-D has been based in Cuba since 1981. This aircraft, which is very able of the electronic reconnaissance, is used for the air monitoring of the global extended sea route. It is known that Bear-D has also an extremely important role in port of operations involving surface-to-surface and the -to-surface missiles. It provides such data as the location of targets for missile launch crews on battleships or craft which are too distant from the targets.

The design characteristics of the Bear-D are identical to the Tu-20. Figure 4 shows the antennas and equipment side:

1. an antenna;
2. a very high frequency omnirange ;
3. a tail radar ;
4. a bullet-shape cowl;
5. a dielectric cowl 2.7m in length;
6. a radio equipment converting board;
7. a knife-shaped antenna;
8. an embedded dielectric panel;
9. a bubble cowl;
10. an array of stub antennas;
11. a cuneiform cowl;
12. a gun turret;
13. a high frequency communication antenna;
14. a big cowl on the belly of the plane, equipped with a giant radar equipment;
15. a bubble-shape cowl, equipped with a "Short Horn" radar.

The main detector of the Bear-D is the I-band "Bigge" radar equipped in the weapon cabin. The scouting range of this large search radar is 360 degrees, the scouting distance is about 161km. The radar underneath the nose aircraft is a "Short Horn" J-band navigation radar with varied frequencies. This radar implements circular

scanning and fan-shaped scanning. It has 4 kinds of pulse recurrent frequencies and 4 kinds of pulse widths.

	1	2	3	4
pulse recurrent frequency	313-316/1	496-504/0.5	624-626/0.4	1249-1253/0.01
pulse width	1.8	1.4	1.3	0.9

In addition, there is an I-band "Bee-Deer" warning radar on the tail of the aircraft. The airborne weapons are: two NR-23 tail cannons and two NR-23 telecontrolled cannons on the belly of the aircraft.

All the discovered Bear-D aircraft have been fitted with a flight-refuelling nose probe. But there is still a small difference among these aircraft. For example, the tail gun turret of the Bear-D sighted during the second half of 1978 was omitted, and it was equipped with a big cowl instead.

Another aircraft was equipped with an antenna trailer. It is said, this kind of antenna is necessary for the high frequency communication and the very low frequency transmission with the long-distance cruise submarine.

#### Tu-16 Badger-D,-F,-K

The Tu-16 is a super-subsonic, medium-range bomber delivered in 1955. Now, a great quantity of Tu-16 are still

in service in the Soviet long-range air force and the Soviet Navy. This aircraft has 11 modified versions, among which, versions-D, -F, and -K are electronic reconnaissance aircraft. The external form of the diverse versions of the Tu-16 is identical on the whole, only their equipment is different, or their local appearance varies slightly.

The Badger-D was first discovered between 1962 and 1963; The Soviet armed forces are still heavily fitted out with it, especially the Northern Fleet and the Pacific Fleet. One of its main duties is the regular observation of the naval manoeuvre of the North Atlantic Treaty Organization(NATO), and electronic reconnaissance around NATO.

The radar covering, on the nose of the Badger-D, replaced the transparent nose covering and the nose gun of the basic version. The airborne radars include: an I-band "Dust-Fungus" search radar, a J-band "Short Horn" navigation radar for bombers and a "Bee-Deer" tail warning radar. The "Dust-Fungus" radar has the capability for long-distance cartographic survey and for missile guidance; its pulse frequency changes at the range of 414-418 and 621-628. The width of the beam of the "Bee-Deer" radar is 4 degrees; a coniform airspace around the central line of the aircraft thus can be covered.

The Badger-F was discovered almost at same time as the version D. It differs from the version D in keeping the transparent nose covering: its main detectors have been equipped in the suspended cabin of the wing. There are radar coverings at both ends of this suspended cabin. This shows that the frequency range of its helical antenna is 50 MHZ-18 KMc/s. Comparatively, the position of the mid-wing of this plane doesn't obstruct the field of vision. The version F seems to be considered satisfactory. Its outward appearance hasn't changed during the whole period of the use of this plane. The main detection equipment also includes a camera in the forward part of the weapon cabin.

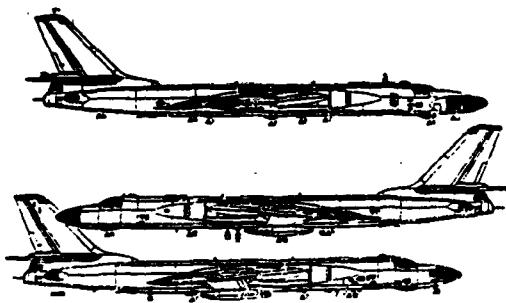


Figure 5. Tu-16 Badger-D and Badger-F

The Badger-K is the newest electronic reconnaissance aircraft of the Tu-16 series. The photographs of this plane were taken by Western countries in 1981. The outstanding characteristics of the external form of this plane are: each end of the weapon cabin has a drop-shaped cowl; the equipment underneath the glass nose is probably a "Short Horn"

radar. All three electronic reconnaissance aircraft aforementioned carry some self-defense weapon: 6 NR-23 cannons are equipped at the tail turret, the telecontrolled top turret and the belly turret respectively. Now, about 80 electronic reconnaissance aircraft and interference aircraft (the Badger-H, Badger-J) of the Tu-16 series are on service in the Soviet Navy. Judging by the quantity, the Tu-16 is the principal aircraft of the Soviet Navy for electronic warfare. Figure 5 shows some external characteristics of the Badger-D and Badger-F. In the figure, the aircraft on top is version D, and the two below are version F.

Figure 5 shows:

1. a very high frequency antenna;
2. the "Bee-Deer" tail warning radar
3. the radar covering of "Dust-Fungus";
4. the "Short Horn" radar underneath the body of the plane;
5. a high frequency antenna;
6. a window;
7. a bubble cowl;
8. a dielectric panel;
9. an arm of an antenna;
10. a knife-shaped antenna;
11. A321A navigation radar;
12. a T-shaped antenna;
13. a camera window;

15. a sensor cabin;
16. a set of antennas;
17. the extension of the wingtip (only some planes have it);
18. a bubble cowl;
19. a set of front antennas;
20. an idle cannon cabin.

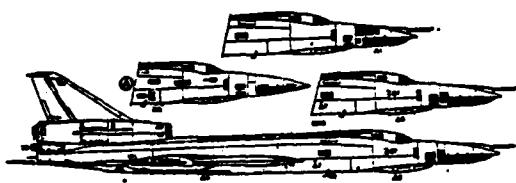


Figure 6. Tu-22 Blinder-C

#### The Tu-22 Blinder-C

The Tu-22 is the first supersonic bomber of the Soviet Union.

It was first made public in 1961. It looks as thought the beginning of its design was in 1955, and the armed forces were equipped with it since 1962. The Tu-22 has altogether 5 versions. The version Blinder-C is a maritime electronic reconnaissance aircraft, all of which, are part of the equipment of the Soviet Baltic Fleet. This aircraft is a very efficient detector-platform. Figure 6 is the external characteristics of the "Blinder". The figure shows that the

positions of the dielectric panels among the diverse aircraft are very different.

1. "Down Beat" navigation and missile guidance radar;
2. "Bee-Deer" (or "Fan-Tail") tail warning radar;
3. a wingtip cowl (perhaps for the antenna for electronic warfare);
4. a bubble cowl;
5. a camera cabin modified from weapon cabin, inside of that there are 6 cameras;
6. an antenna;
7. a knife-shaped antenna;
8. a bubble antenna or a stub antenna;
9. a knife-shaped antenna;
10. a window.

#### Main characteristics of the seven aircraft

	peak velocity	ceiling	ultimate range
Badger-D/F/K	992km/h	12,800m	6,000km
Bear-D	805km/h	~15,000m	12,000-14,000km
Blinder-C	M1.5	18,300m	5,500km
Young Fox-B	777km/h		5,700km
Black Crow-A	675km/h		6,500km

(The original Chinese text is edited by Shi-song Li based on "International Aviation", Nov. 1984)

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